UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: Group: Attorney Docket # 1721

Applicant(s) :   THEISEN, J., ET AL

Serial No.   :

Filed   :

For   :   SWITCH DEVICE FOR A STARTER OF AN INTERNAL COMBUSTION ENGINE OF A MOTOR VEHICLE

SIMULTANEOUS AMENDMENT

October 1, 2001

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

S I R S:

Simultaneously with filing of the above identified application please amend the same as follows:

In the Claims:

Cancel all claims without prejudice.

Substitute the claims attached hereto.

REMARKS:

This Amendment is submitted simultaneously with filing of the above identified application.

With the present Amendment applicant has amended the claims so as to eliminate their multiple dependency.

Consideration and allowance of the present application is most respectfully requested.

Respectfully submitted,

Michael J. Striker
Attorney for Applicant(s)
Reg. No. 27233

Claims

     1. A circuit arrangement for controlling a starting relay
of a starter for a motor vehicle internal combustion engine,
having a battery (20) which is electrically connected to the
starting relay (4), and having a computer (19) that is disposed
in the control circuit of the starting relay (4), characterized
in that between the computer (19) and the starting relay (4), a
memory circuit (2) is disposed, which during a chronologically
limited undervoltage of the battery (20) is embodied to maintain
the existing control signal (STEN) for the starting relay (4).

     2. The circuit arrangement of claim 1, characterized in
that the memory circuit (2) has a flip-flop (14, 15).

     3. The circuit arrangement of claim 2, characterized in
that the flip-flop (14, 15) is settable by means of an RC circuit
(17, 18) in such a way that the starting relay (4) is set to the
inactive state upon reapplication of the battery voltage (after a
power failure).

     4. The circuit arrangement of [one of the foregoing
claims] claim 1, characterized in that between the computer (19)
and the memory circuit (2), a locking circuit (1) is disposed.

     5. The circuit arrangement of claim 4, characterized in
that the locking circuit (1) detects the instantaneous logic
state at a control input (STEN) and stores it in memory with the
aid of the memory circuit (2).

     6. The circuit arrangement of claim 4 [or 5],

characterized in that the locking circuit (1) is embodied to maintain the triggering for the starting relay (4) if the computer (19) is in a reset mode.

5   7.   The circuit arrangement of [one of claims 4-6] claim 4, characterized in that the computer (19) switches the locking circuit (1) to be inactive once the undervoltage of the battery (20) is ended.

10   8.   The circuit arrangement of [one of the foregoing claims] claim 1, characterized in that the computer (19) has a program with which the locking circuit (1) and/or the memory circuit (2) can be controlled.

15   9.   The circuit arrangement of [one of the foregoing claims] claim 1, characterized in that the locking circuit and memory circuit (1, 2) span a voltage dip down to approximately 0 volts.

20   10.   The circuit arrangement of claim 9, characterized in that voltages up to approximately 4 volts can be spanned without chronological limitation, and voltages under 4 volts can be spanned with chronological limitation.

Claims

1. A circuit arrangement for controlling a starting relay of a starter for a motor vehicle internal combustion engine, having a battery (20) which is electrically connected to the starting relay (4), and having a computer (19) that is disposed in the control circuit of the starting relay (4), characterized in that between the computer (19) and the starting relay (4), a memory circuit (2) is disposed, which during a chronologically limited undervoltage of the battery (20) is embodied to maintain the existing control signal (STEN) for the starting relay (4).

2. The circuit arrangement of claim 1, characterized in that the memory circuit (2) has a flip-flop (14, 15).

3. The circuit arrangement of claim 2, characterized in that the flip-flop (14, 15) is settable by means of an RC circuit (17, 18) in such a way that the starting relay (4) is set to the inactive state upon reapplication of the battery voltage (after a power failure).

4. The circuit arrangement of claim 1, characterized in that between the computer (19) and the memory circuit (2), a locking circuit (1) is disposed.

5. The circuit arrangement of claim 4, characterized in that the locking circuit (1) detects the instantaneous logic state at a control input (STEN) and stores it in memory with the aid of the memory circuit (2).

6. The circuit arrangement of claim 4, characterized in

that the locking circuit (1) is embodied to maintain the
triggering for the starting relay (4) if the computer (19) is in
a reset mode.

5   7.   The circuit arrangement of claim 4, characterized in
that the computer (19) switches the locking circuit (1) to be
inactive once the undervoltage of the battery (20) is ended.

8.   The circuit arrangement of claim 1, characterized in
that the computer (19) has a program with which the locking
circuit (1) and/or the memory circuit (2) can be controlled.

9.   The circuit arrangement of claim 1, characterized in
that the locking circuit and memory circuit (1, 2) span a voltage
15   dip down to approximately 0 volts.

10.   The circuit arrangement of claim 9, characterized in
that voltages up to approximately 4 volts can be spanned without
chronological limitation, and voltages under 4 volts can be
20   spanned with chronological limitation.